REMARKS

Initially, the undersigned wishes to acknowledge the Examiner's courtesy in providing a telephonic interview on February 17, 2004 to discuss the outstanding rejections and objection. The substance of that interview appears in the appropriate sections below.

By this Amendment, Applicants amend claims 4, 13, 22, and 25. Claims 1-27 remain pending.

In the Office Action of November 18, 2003[1] ("OA"), claims 1-3, 5, 8, and 9 were rejected under 35 U.S.C. § 102(b) as being anticipated be U.S. Patent No. 5,898,793 to *Karron et al.* ("*Karron*"); claims 10-12, 14, 17, 18, 19-21, 23, 26, and 27 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Karron*; claims 4, 6, 13, 15, 22, and 24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Karron* in view of U.S. Patent No. 4,710,876 to *Cline et al.* ("*Cline*"); and claims 7, 16, and 25 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Karron* in view of U.S. Patent No. 5,448,686 to *Borrel et al.* ("*Borrel*"). The rejections set forth in the Office Action should be withdrawn for the reasons discussed below.

Rejection of claims 1-3, 5, 8, and 9 under 35 U.S.C. § 102(b)

Applicants traverse the rejection of claims 1-3, 5, 8, and 9 under 35 U.S.C. § 102(b) because the claims are not anticipated by *Karron*. In order to properly anticipate Applicants' claimed invention under 35 U.S.C. § 102(b), each and every element of the claim in issue must be found, either expressly described or under principles of inherency, in a single prior art reference. Further, "[t]he identical invention must be shown in as complete detail as is contained in the...claim." See M.P.E.P. § 2131 (8th Ed., Aug. 2001), quoting *Richardson v. Suzuki Motor*

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[1] The Office Action contains a number of statements reflecting characterizations of the related art and the claims. Regardless of whether any such statement is identified herein, Applicants decline to automatically subscribe to any statement or characterization in the Office Action.

Co., 868 F.2d 1126, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989). Finally, "[t]he elements must be arranged as required by the claim." M.P.E.P. § 2131 (8th Ed. 2001), p. 2100-69.

Claim 1 recites a method for identifying hidden and visible surfaces on an n-dimensional object including:

> generating an n-dimensional image of an object, said image including a first plurality of n-dimensional components that define a shape and orientation of the image and a plurality of parts located inside the image; and
>
> superimposing an n-dimensional grid of pixels on...[the generated] image, said pixels arranged in a lattice structure such that each pixel of said grid corresponds to one of a plurality of vertices of an m-sided cell, wherein each side of said m-sided cell includes at least four vertices.

As explained in the telephonic interview, *Karron* fails to disclose the above recitations. *Karron* describes a system for "surface rendering...of arbitrary structures within the interior of a solid body" (Abstract). In *Karron*'s system, as the Examiner notes, "signal patterns representing the value of at least one physical property associated with a 3D body at regularly spaced grid locations within the body" are stored in a memory (col. 6, lines 5-13). As *Karron* explains, "the pixel elements corresponding to one voxel are simultaneously retrieved from the data storage" (col. 10, lines 44-46) and the system detects intersections "of the surface [of interest] with the voxel" (col. 10, lines 50-55).

Although *Karron* mentions "regularly spaced grid locations," the reference does not teach "superimposing an n-dimensional grid of pixels on...[a generated] image," as recited in claim 1. Storing signal patterns that represent physical property values "at regularly spaced grid locations within the body," as mentioned by *Karron*, does not constitute "superimposing an n-dimensional grid of pixels on...[a generated] image," as recited in claim 1. In *Karron*, the voxels are not superimposed on a generated image that includes components that define a shape and orientation

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of the image and a plurality of parts located inside the image, as recited in claim 1. Instead, the voxels define unit volumes with which physical property measurements of the interior of a solid body are associated. Associating physical property measurements with specific positions within a body (i.e., voxels) is not consistent with "superimposing an n-dimensional grid of pixels on...[a generated] image," as recited in claim 1.

As set forth above, anticipation under 35 U.S.C. § 102(b) requires that each and every claim element be disclosed in as complete detail as is in the claim by the applied reference. *Karron* does not teach each and every feature of independent claim 1 and therefore, as a matter of law, cannot anticipate this claim. The rejection of claim 1 under 35 U.S.C. §102(b) as anticipated by *Karron* should therefore be withdrawn. Applicants point out that the Examiner indicated in the interview that the rejection of claim 1 would be reconsidered.

Claims 2, 3, 5, 8, and 9 depend from claim 1 and are allowable for at least the same reasons presented above in connection with allowable base claim 1. Accordingly, Applicants request withdrawal of the rejection under 35 U.S.C. § 102(b) and the timely allowance of claims 1-3, 5, 8, and 9.

Rejection of claims 10-12, 14, 17, 18, 19-21, 23, 26, and 27 under 35 U.S.C. § 103(a)

Applicants traverse the rejection of claims 10-12, 14, 17, 18, 19-21, 23, 26, and 27 because a *prima facie* case of obviousness has not been established. To establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a), each of three requirements must be met. First, the references, taken alone or in combination, must teach or suggest each and every element recited in the claims. See M.P.E.P. § 2143.03 (8th ed. 2001). Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references in a manner resulting in the claimed invention. Third, a reasonable expectation of success must exist. Moreover, each of these requirements

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must "be found in the prior art, and not be based on applicant's disclosure." M.P.E.P. § 2143 (8th ed. 2001).

A *prima facie* case of obviousness has not been established because, among other things, *Karron* fails to teach or suggest each and every element recited in Applicants' claims.

Independent claims 10 and 19, although of different scope, include recitations that parallel those in allowable claim 1. For example, claim 10 recites, *inter alia*:

> a module for superimposing an n-dimensional grid of pixels on...[a generated] image, said pixels arranged in a lattice structure such that each pixel of said grid corresponds to one of a plurality of vertices of an m-sided cell, wherein each side of said m-sided cell includes of at least four vertices;

and claim 19 recites, *inter alia*:

> superimposing an n-dimensional grid of pixels on...[a generated] image, said pixels arranged in a lattice structure such that each pixel of said grid corresponds to one of a plurality of vertices in an m-sided cell, wherein each side of said m-sided cell includes at least four vertices

For at least the reasons given above in connection with claim 1, *Karron* does not teach at least the "superimposing" element recited in claims 10 and 19. *Karron* also fails to render this element obvious. Because *Karron* fails to teach or suggest each and every element recited in claims 10 and 19, a *prima facie* case of obviousness has not been established based on this reference.

In rejecting claims 10 and 19, the Examiner alleges: "it would have been obvious...to embody the system and method of *Karron* as an apparatus [and]...a machine-readable storage device..." (OA, pages 3-4). Regardless of the validity of these allegations[2], a *prima facie* case of

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[2] The Examiner alleges that "it is well known that any method of image processing may be embodied as a device to carry out that method" (OA, pages 3-4). Applicants do not acquiesce to this allegation, and the Examiner provides no evidence, beyond pure conjecture, to support the allegation.

obviousness has not been established at least because *Karron* fails to teach or suggest each and every element of claims 10 and 19, as explained above.

Claims 11, 12, 14, 17, and 18 depend from allowable base claim 10; and claims 20, 21, 23, 26, and 27 depend from allowable base claim 19. Claims 11, 12, 14, 17, 18, 20, 21, 23, 26, and 27 are allowable for at least the same reasons presented above in connection with allowable base claims 10 and 19, respectively. Accordingly, Applicants request withdrawal of the rejection under 35 U.S.C. § 103(a) and the timely allowance of claims 10-12, 14, 17, 18, 19-21, 23, 26, and 27.

Rejection of claims 4, 6, 13, 15, 22, and 24 under 35 U.S.C. § 103(a)

Applicants traverse the rejection of claims 4, 6, 13, 15, 22, and 24 under 35 U.S.C. § 103(a) because a *prima facie* case of obviousness has not been established, as discussed below.

Claims 4 and 6 ultimately depend from claim 1; claims 13 and 14 ultimately depend from claim 10; and claims 22 and 24 ultimately depend from claim 19. As explained above, *Karron* fails to teach or suggest all of the elements recited in claims 1, 10, and 19. *Karron* therefore fails to teach each and every element recited in dependent claims 4, 6, 13, and 15, which include all of the elements of base claims 1, 10, and 19, respectively.

Cline does not cure the deficiencies of *Karron*. *Cline* describes a system for "displaying three dimensional surface images," which utilizes "a case table for rapid retrieval of surface approximation information" (Abstract). *Cline* does not disclose at least "superimposing an n-dimensional grid of pixels on...[a generated] image," as recited in claims 1, 10, and 19, and therefore also recited in claims 4, 6, 13, and 15. Neither *Karron* nor *Cline*, nor any combination thereof, teaches or suggests each and every element recited in claims 4, 6, 13, 15, 22, and 24.

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For at least this reason, a *prima facie* case of obviousness has not been established with respect to these claims.

Moreover, claim 4, as currently presented, recites, *inter alia*:

> repeating the identifying, testing, and storing steps for every m-sided cell located inside the grid, excluding cells inside the image.

Neither *Karron* nor *Cline*, nor any combination thereof, teaches or suggests at least this recitation. Although *Karron* mentions, as the Examiner notes, detecting intersections "of the surface [of interest] with the voxel" (col. 10, lines 50-55; see col. 4, lines 33-39), the reference does not disclose, for example, "identifying, testing, and storing [as recited in claim 4] for every m-sided cell located inside the grid, excluding cells inside the image," as claimed.

Moreover, as explained in the interview, *Cline* fails to cure *Karron*'s deficiencies. The Examiner alleges that *Cline* "describes...intersection testing, which is done sequentially for each voxel in the grid" (OA, page 4). Even if this allegation were valid—to which Applicants do not acquiesce—such a feature does not constitute the "repeating" step recited in claim 4. That is, sequentially testing each voxel in the grid is not the same as "identifying, testing, and storing...for every m-sided cell located inside the grid, excluding cells inside the image," as recited in claim 4. Neither *Karron* nor *Cline*, nor any combination thereof, teaches or suggests at least the "repeating" element of claim 4. The applied references therefore fail to teach or suggest each and every element recited in claim 4. Applicants point out that the Examiner indicated in the interview that the above-noted "repeating" element of claim 4, as currently presented, would likely distinguish the claim from the applied references.

Further, a *prima facie* case of obviousness has not been established at least because the requisite motivation to combine is lacking. Determinations of *prima facie* obviousness must be supported by a finding of "substantial evidence." *See In re Zurko*, 258 F.3d 1379, 1386 (Fed.

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Cir. 2001). Specifically, unless "substantial evidence" found in the record supports the factual determinations central to the issue of patentability, including motivation, the rejection is improper and should be withdrawn.

In this case, there is no "substantial evidence" in the record to support the attempted combination of *Karron* and *Cline*, and the requisite "clear and particular" motivation to support a *prima facie* case of obviousness is lacking. The Office Action does not established, by substantial evidence, that a skilled artisan having the art before him would have been motivated to combine the references in a manner resulting in Applicants' claimed invention. The Examiner alleges that a skilled artisan would have combine *Karron* and *Cline* "because the sequential testing of each cell in the grid is a simple way to make sure all cells are checked fro intersections." This statement is not supported by substantial evidence and does not provide the requisite motivation. For example, the Examiner does not provide any evidence to show the simplicity of sequential testing or that the alleged combination would in fact result in a simple way to make sure all cells are checked for intersections. Further, the Office Action does not provide any reasoning or evidence to show why a skilled artisan would have combined the references to "make sure all cells are checked."

Applicant calls attention to M.P.E.P. § 2143.01, which makes clear that

> The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination (citations omitted).

The Office Action fails to show that either *Karron* or *Cline* "suggests the desirability of the" modification. The Office Action provides no objective reason why, other than to attempt to meet the terms of the claims, a skilled artisan would have been motivated to combine the references. And as M.P.E.P. § 2142 articulates:

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> Knowledge of applicant's disclosure must be put aside ...impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

Applicant submits that a skilled artisan would not have been motivated to combine *Karron* and *Cline*. For at least the foregoing reasons, a *prima facie* case of obviousness has not been established with respect to claim 4. Applicants therefore deem claim 4 allowable.

Claim 6 recites, *inter alia*:

> identifying a plurality of m-sided cells adjacent to said m-sided cell when the n-dimensional component does not abut or overlap at least one side of said m-sided cell; and
>
> for each of said plurality of adjacent m-sided cells, storing an identifier of an n-dimensional component when the n-dimensional component abuts or overlaps at least one side of said adjacent m-sided cells

Neither *Karron* nor *Cline*, nor any combination thereof, teaches or suggests at least these elements. The Examiner alleges (OA, page 4) that *Karron* "describes a method whereby the voxels sharing a voxel face with an *intersected* voxel are checked for intersections" (emphasis added). As explained in the interview, the Examiner's allegation serves only to underscore a distinction between claim 6 and *Karron*: *Karron* mentions that voxels sharing a voxel face with an *intersected* voxel are checked for intersections, whereas claim 1 recites identifying cells adjacent to a cell when the n-dimensional component *does not abut or overlap* at least one side of said m-sided cell. *Karron* does not teach or suggest the above-noted elements recited in claim 6.

Cline fails to cure *Karron*'s deficiencies. The Examiner alleges that *Cline* "describes...intersection testing, which is done sequentially for each voxel in the grid" (OA, page 4). Even if this allegation were valid—to which Applicants do not acquiesce—such a feature does not constitute the above-noted elements recited in claim 6. That is, sequentially testing each voxel in the grid is not the same as identifying cells adjacent to a cell when the n-

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dimensional component *does not* abut or overlap at least one side of said cell and storing an identifier of an n-dimensional component when the n-dimensional component abuts or overlaps at least one side of said adjacent cells, as recited in claim 6. Neither *Karron* nor *Cline*, nor any combination thereof, teaches or suggests each and every element of claim 6.

Further, assuming *arguendo* that the elements of claim 6 could be found in *Karron* and *Cline*, the requisite motivation for combining *Karron* and *Cline* is lacking for at least the reasons presented above in connection with claim 4. For at least the foregoing reasons, a *prima facie* case of obviousness has not been established with respect to claims 6. Applicants point out that the Examiner indicated in the interview that the rejection of claim 6 would be reconsidered.

Each of claims 13 and 22 includes recitations paralleling those in claim 4 and is allowable for at least the reasons presented above in connection with claim 4. Likewise, each of claims 15 and 24 includes recitations paralleling those in claim 6 and is allowable for at least the reasons presented above in connection with claim 6. Accordingly, Applicants request withdrawal of the rejection under 35 U.S.C. § 103(a) and the timely allowance of claims 4, 6, 13, 15, 22, and 24.

Rejection of claims 7, 16, and 25 under 35 U.S.C § 103(a)

Claim 7 depends from allowable base claim 1; claim 16 depends from allowable base claim 10; and claim 25 depends from allowable base claim 19. Claims 7, 16, and 25 therefore include all of the elements recited in base claims 1, 10, and 19, respectively. As explained above, *Karron* fails to teach or suggest each and every element recited in claims 1, 10, and 19. *Karron*, therefore, fails to teach or suggest each and every element recited in claims 7, 16, and 25.

Borrel fails to cure all of *Karron*'s deficiencies. *Borrel* describes a method for preparing "on object for display" (Abstract). *Borrel* does not disclose:

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> generating an n-dimensional image of an object, said image including a first plurality of n-dimensional components that define a shape and orientation of the image and a plurality of parts located inside the image; and
>
> superimposing an n-dimensional grid of pixels on...[the generated] image, said pixels arranged in a lattice structure such that each pixel of said grid corresponds to one of a plurality of vertices of an m-sided cell, wherein each side of said m-sided cell includes at least four vertices,

as claimed. For at least this reason, a *prima facie* case of obviousness has not been established with respect to claims 7, 16, and 25.

Even if all of the elements recited in claims 7, 16, and 25 could be found in some combination of *Karron* and *Borrel*—to which Applicants do not acquiesce—a *prima facie* case of obviousness has not been established at least because the requisite motivation to combine the references is lacking.

No "substantial evidence" exists in the record to support the attempted combination of *Karron* and *Borrel*, and the requisite "clear and particular" motivation to support a *prima facie* case of obviousness is lacking. The Office Action does not established, by substantial evidence, that a skilled artisan having the art before him would have been motivated to combine the references in a manner resulting in Applicants' claimed invention. The Examiner alleges that a skilled artisan would have combine *Karron* and *Borrel* "because a user will desire to have different levels of resolution in different applications." This statement is not supported by substantial evidence and does not provide the requisite motivation. For example, the Examiner does not provide any evidence to show why a user "will desire to have different levels of resolution in different applications" in *Karron*'s system. That is, although *Borrel* might mention selecting different resolutions, this in and of itself is not a proper motivation for combining *Karron* and *Borrel* to achieve a capability to select different levels of resolution.

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The Office Action fails to show that either *Karron* or *Borrel* "suggests the desirability of the" combination. The Office Action provides no objective reason why, other than to attempt to meet the terms of the claims, a skilled artisan would have been motivated to combine the references. And as explained, M.P.E.P. § 2142 articulates:

> Knowledge of applicant's disclosure must be put aside ...impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

Applicant submits that a skilled artisan would not have been motivated to combine *Karron* and *Borrel*. For at least the foregoing reasons, a *prima facie* case of obviousness has not been established with respect to claims 7, 16, and 25. Applicants therefore deem these claims allowable.

Information Disclosure Statements

Applicants submitted Information Disclosure Statements (IDSs) in this application on November 30, 2001 and January 7, 2002, copies of which are enclosed along with copies of the stamped postcards showing that the IDSs were filed on those dates. Applicants, however, have not received acknowledgement from the Examiner of the filed IDSs. Applicants respectfully request that the Examiner acknowledge the IDS filed November 30, 2001 and January 7, 2002 by initialing the PTO 1449 forms and returning copies to Applicants.

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Conclusion

In view of the foregoing, Applicants respectfully request the reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
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Dated: February 18, 2004

By: _____
Frank A. Italiano
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